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PATENT SPECIFICATION

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(54) APPARATUS FOR SEPARATING OPENED FIBRE FLOCKS

(71) We, MASCHINENFABRIK RIETER A.G., a body corporate organised under the laws of Switzerland, of Winterthur, Switzerland, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

The present invention relates to an apparatus for separating opened fibre flocks from a transporting air stream carrying flocks in a stationary depositing chute connected to a pneumatic flock transporting duct, preferably provided with a perforated wall, for forming a fibre flock layer to be fed to a spinning preparatory machine.

Such devices are in use in spinning mills particularly for feeding cards and cleaning machines, in order to separate the fibre flocks opened by mechanical bale openers or pluckers or by blending bale breakers and pneumatically transported to one or a plurality of machines via transporting air stream ducts, from the transporting air stream before they enter a machine. In order to ensure best maintenance of a constant sliver weight of for example the weight of the sliver delivered by a card, uniformity of the card feed, and thus the uniformity of the flock layer fed, as known, are of utmost importance. As shown by experience, it can prove difficult in a direct card feed using a flock layer formed by a depositing chute arranged at the card intake due to several, partly not yet explicable reasons partially connected with the arrangement of the processing plant and also with variable properties of the fibre flocks processed, to ensure sufficiently even density of the fibre flock layer using the methods known thus far.

It thus is an object of the present invention to eliminate this disadvantage. According to the invention there is provided an apparatus for separating opened fibre flocks from a transporting air stream carrying fibre flocks in a depositing chute fed by a pneumatic transporting duct and provided with perforations for draining the air and retaining the flocks, wherein adjustable deflecting means acting pneumatically and/or mechanically are provided so as to act between a connecting piece of the chute connected to the pneumatic transporting duct and a flock deposit in the chute body, the deflecting means acting in the direction of the width of the chute on the transporting air stream carrving fibre flocks.

The invention will now be described in more detail with reference to the accompanying drawings in which:

Figure 1 is a front view of an embodiment of the invention with a front wall removed.

Figure 2 is a cross-sectional view of the embodiment shown in Figure 1.

Figure 3 is a top view of the same apparatus.

Figure 4 is a top view of another embodiment of the invention and,

Figure 5 is a schematic block diagram illustrating the function of the apparatus of the invention.

In the embodiments illustrated, the apparatus of the invention is arranged on a flock depositing chute 1 at the intake side of, for example, a card which is not shown in the drawings. The flock depositing chute 1 has a chute body 1*a*, the design of which is known as such, for example, with a slotted wall, and an upper chute part or head 1*b*. The chute 1 is connected via a connecting piece 2 to a pneumatic transporting duct not shown in the drawing.

In the embodiment illustrated in Figures 1 to 3, the upper chute part 1*b* can be detached from the chute body 1*a* and is provided with two entry openings 3 and 3' each equipped with a centrifugal wheel 4 and 4' preferably designed as a suction fan for the transporting air stream carrying flocks. The two entry openings 3 and 3' in the upper chute part 1*b* in this arrangement are connected to a pneumatic transporting duct via a substantially fork-shaped two-pronged connecting piece. In order to

deflect the transporting air stream carrying flocks more towards one or the other of the entry openings 3, 3' (as needed for uniformly distributing the fibre flocks deposited across the full width B of the chute) adjustable deflecting means acting on the transporting air stream carrying fibre flocks in the direction of the chute width B are arranged at suitable locations between the connecting piece 2 and the flock deposit in the chute body 1*a*, suitably, for example, in the connecting piece 2 itself. For this purpose a passage opening 5 is provided in one, or preferably in both sides of the connecting piece 2, as shown particularly in Figure 3. Each opening 5 has an adjustable sealing element 6. Suitable activating mechanisms are provided for adjusting the sealing elements 6 for example automatic adjusting elements 7 or a combination of alternatively automatically or manually activated adjusting elements 7 and 8.

The pneumatic deflection action on the transporting air stream is effected by a secondary air stream which in the Figure 3 construction enters through the passage opening 5 under the influence of the higher pressure of the surrounding room if one of the two sealing elements 6 is opened. The secondary air stream has a transverse component *t* i.e. a component acting as a bias on the transporting air stream.

In the alternative embodiment shown in Figure 4, an upper chute part 1*c* has no centrifugal wheels, or at least no wheels acting as suction fans. Chutes of this type are in most cases connected in groups to a common pneumatic transporting duct, the pressure in this duct being above atmospheric pressure. In order to create a secondary air stream with a component *t* acting as a bias on the transporting air stream, the intake of the secondary air must be ensured in a different manner, for example, from a system of compressed air. If the upper chute part 1*c* has no centrifugal wheels, a single entry opening instead of two as shown in Figure 1 can be more suitable. This entry opening can extend over the same width as the pair of openings 3 of Figure 1 so that instead of a fork-shaped connecting piece, a connecting piece of funnel shape (seen from the top, as shown for example in Figure 4) can be provided.

In a further embodiment, derived from the embodiment described with reference to Figures 1 and 2 with two centrifugal wheels, instead of, or in addition to, the pneumatically acting deflecting means shown in Figure 3, mechanically acting adjustable means for the transporting air stream can also be provided at suitable locations. As an example of such deflecting means a pivotable guide blade 12 (as shown in Figure 1) may be located in the upper chute part 1*b*, according to the direction of rotation of the centrifugal wheels 4,4' between the wheels 4, 4' or one each at the two chute side walls. For adjusting the guide blade 12 automatically as well as manually, activated adjustment elements 7, 8, each of similar or identical design to the other, can be provided, as hereinbefore described with reference to the embodiments of the present invention.

Adjusting screws with handwheels and/or with adjusting spindles with motors activated manually by switches, can for example be provided for manual adjustment of the deflecting means. Manually activated adjusting means for the deflecting means are especially useful for infrequently adjusting flock deposition.

A further alternative can be derived from the embodiment containing two centrifugal wheels designed as suction fans. In this alternative each centrifugal wheel 4, 4' is provided with an individually controlled drive motor, for example with a drive motor 17 for the left hand centrifugal wheel 4 and with a drive motor 17' for the right hand centrifugal wheel 4' in Figure 1. This arrangement can be used as a deflecting means in so far as the rotational speed of either of the two controlled drive motors 17, 17' can be varied so that the transporting air stream is directed more towards the right or left side of the chute owing to the differing suction or blowing forces. For adjusting the rotational speed of the centrifugal wheels, a speed adjuster 18 can of course be provided. In this arrangement also, the transporting air stream can be controlled or guided respectively.

In order to achieve automatic adjustment of the pneumatically acting deflecting means as well as of the mechanically acting deflecting means for the tranporting air stream, at least two detectors 13, 14 for the height of the flock column deposited in the chute body 1*a* are normally arranged in the large side walls of the chute body 1*a* at suitable vertical distances from the fibre flock entry as well as from the fibre flock outlet, both at the same height h, and at a suitable horizontal distance *d*. The detectors 13, 14 may be so-called optical barriers, particularly light beam barriers with an optical emitter and receiver element each 13*a* and 14*a*, and 13*b* and 14*b* respectively, or other elements of suitable type, e.g. ultrasonic detectors. For automatic adjustment of the deflecting means 5 (not shown), 6 and 12, these elements are suitably connected with the detectors 13, 14 according to their type, as shown schematically in Figure 5, the arrangement of the individual components approximately corresponding to the one

shown in Figure 1. In connection with the optical detectors 13, 14, electrically or electronically controlled, pneumatically or hydraulically activating adjusting elements 7 for the deflecting means are feasible.

The function of the apparatus will now be described with reference to Figures 1 to 5:

1.0 Two detectors 13, 14 being arranged at a height h_1 on the chute body 1*a* and each being connected for example with one of the adjustable deflecting means, or with their adjusting elements 7 respectively, the detector 14 is blacked out first if the depositing height *h* increases faster in the right hand region of the chute, as indicated in Figures 1 and 5. In this case, the adjusting element 7 of the deflecting elements chosen in any of the design examples is activated. This can for example be the adjusting element 7 shown in Figures 3 and 4 at the right hand upper portion of the connecting piece 2 or at the right hand side of the connecting piece 10, which activates opening of the sealing element 6 and thus permits entry of the secondary air stream for deflecting the transporting air stream towards the left hand region of the chute.

1.1 The detectors 13, 14 can be connected correspondingly with the adjusting element 7 of a guide blade 12 instead of with the adjusting elements 13, 14 arranged on the connecting pieces 2, 10. If the detector 14 is activated, the guide blade 12 is pivoted, so that the transporting air stream is deflected towards the left hand side, flock deposition in the right hand region of the chute thus being practically stopped until the depositing height *h* in the left hand region of the chute also has reached the height h_1. As this level is reached the detector 13 activated then, simultaneously stops the fibre flock supply from the machine supplying flocks in a manner known as such.

2.0 Manually operated adjusting means for the deflecting means can be provided in combination with the automatically activated adjusting means for the deflecting means for occasional calibration or, especially in smaller or simpler plants, also solely for regularly evening out the flock deposition in the chute.

The main advantage of the present invention is that influences, presently still unpredictable or still not known exactly, causing uneven deposition of fibre flocks in the chute, can be eliminated or, automatically evened out so that a uniform density of the flock layer and, if a card is fed, of the card sliver is ensured.

WHAT WE CLAIM IS:—

1. An apparatus for separating opened fibre flocks from a transporting air stream carrying fibre flocks in a depositing chute fed by a pneumatic transporting duct and provided with perforations for draining the air and retaining the flocks, wherein adjustable deflecting means acting pneumatically and/or mechanically are provided so as to act between a connecting piece of the chute connected to the pneumatic transporting duct and a flock deposit in the chute body, the deflecting means acting in the direction of the width of the chute on the transporting air stream carrying fibre flocks.

2. An apparatus according to claim 1, wherein automatically and/or manually actuated adjusting elements are provided for adjusting the deflecting means for the transporting air stream.

3. An apparatus according to claim 2, wherein the connecting piece has on at least one side, a passage opening provided with an adjustable sealing element for a secondary air stream, a component of which acts in the direction of the chute width as a bias to the transporting air stream for deflecting the transporting air stream.

4. An apparatus according to claim 3, wherein the connecting piece has passage openings provided at both sides, each opening having an adjustable sealing element for a secondary deflecting air stream with a component directed as a bias to the transporting air stream.

5. An apparatus according to either of claims 3 and 4, wherein the passage opening or openings are provided at the same height as the deflecting means.

6. An apparatus according to claim 2, wherein the upper part of the chute has two centrifugal fan wheels each driven by a controlled drive motor for varying the rotational speed.

7. An apparatus according to claim 2, wherein the upper part of the chute has two centrifugal fan wheels driven *via* at least one speed adjuster.

8. An apparatus according to claim 2, wherein the upper part of the chute has a guide blade pivotable as a bias to the transporting air stream in the direction of the chute width, the blade having an automatically and/or manually actuated adjusting element for deflecting the transporting air stream.

9. An apparatus according to any one of the preceding claims, wherein the chute has a body with at least two detectors for the deposit height of the fibre flocks deposited in the chute, the detectors being arranged at the same height, spaced from each other, and connected with the adjustable deflecting means for automatically adjusting them as a function of the deposit height.

10. An apparatus according to claim 9, wherein the detectors for controlling the

deposit height are optical or ultrasonic barriers.

11. An apparatus for separating opened fibre flocks from a transporting air stream substantially as described with reference to the accompanying drawings.

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1422861 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

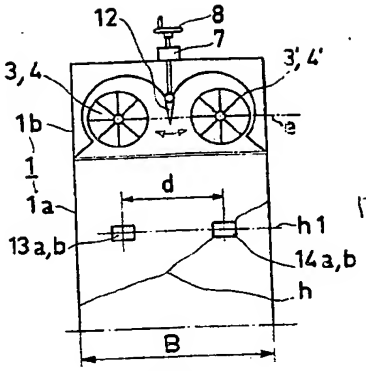

Fig.1

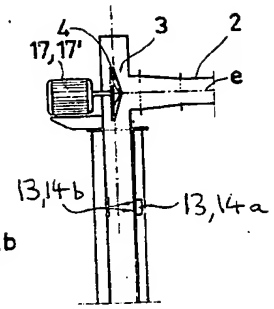

Fig. 2

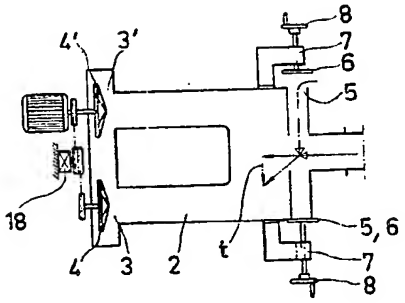

Fig. 3

1422861 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

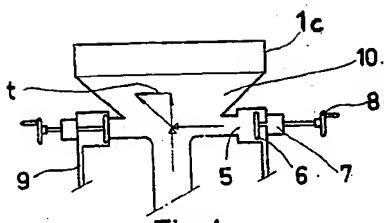

Fig. 4

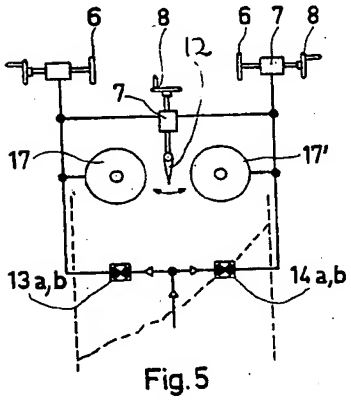

Fig. 5